Oct. 31, 1933. J. H. STONE 1,932,941

BUILDING STRUCTURE

Original Filed Aug. 4, 1927 2 Sheets-Sheet 1

Fig. 1.

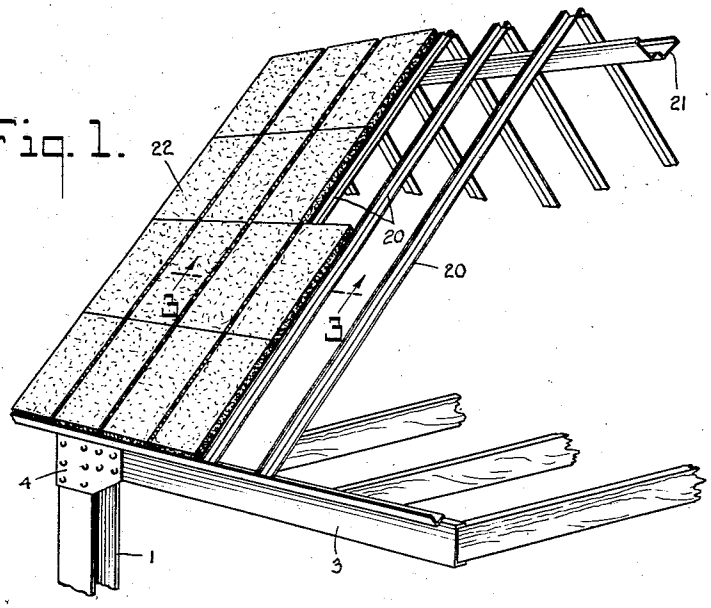
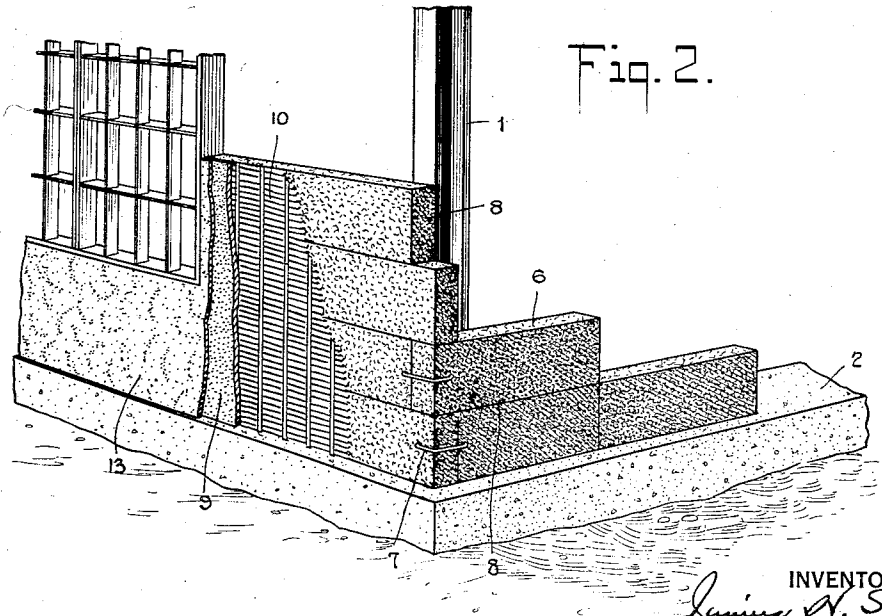


Fig. 2.



INVENTOR,
James H. Stone,
BY
Henry J. Lucke,
His ATTORNEY.

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Fig. 3.

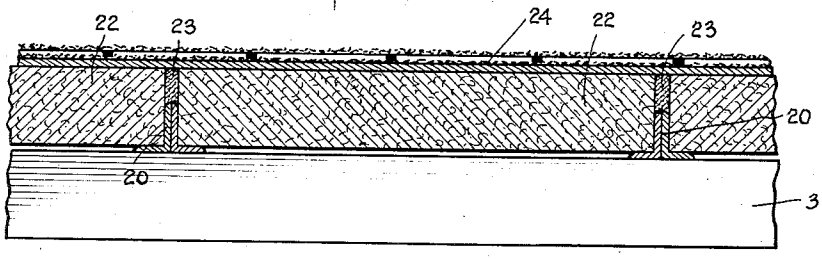


Fig. 4.

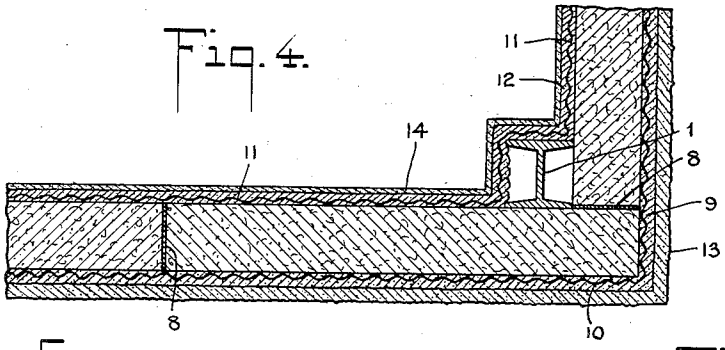


Fig. 5.

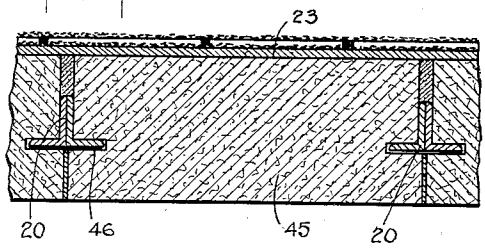


Fig. 6.

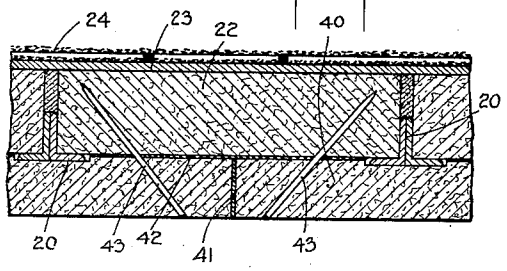
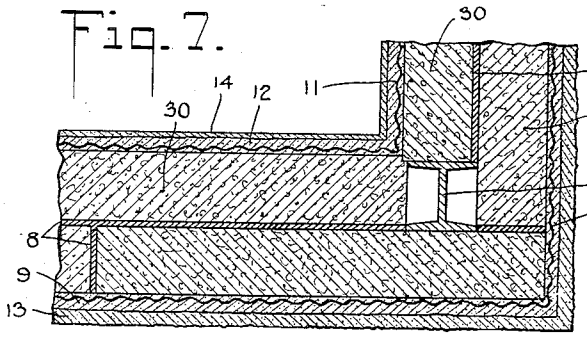


Fig. 7.



INVENTOR
James H. Stone,
BY
Henry J. Ruske,
His ATTORNEY.

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UNITED STATES PATENT OFFICE

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BUILDING STRUCTURE

Junius H. Stone, Port Washington, N. Y.

Application August 4, 1927, Serial No. 210,475
Renewed March 8, 1933

5 Claims. (Cl. 72—45)

My invention relates to building structures adapted for use as residences, and for many other purposes.

An important object is to provide a simple and economical fireproof or highly fire-resistant structure, and this is accomplished by employing slabs or blocks of corkboard as the wall and roof filling or sheathing members, in connection with a steel frame.

By employing these principal structural features to attain the leading object of the invention, I also introduce important additional advantages including the following:

The steel frame determines the structural form of the building, and provides ample strength and stability. The corkboard blocks or sheathing complete the exterior walls, the roof and when desired the interior walls or partitions, and when these slabs or boards are constructed and arranged as hereinafter described they are practically fireproof or highly fire-resistant; are light and therefore economically shipped to the construction site, and easily placed in position on the frame. They are also vermin-proof and effective heat insulators, enabling the building to be very economically heated in winter and keeping its interior cool in summer. The material also has great durability, being practically immune to decay or other destructive forces, and is also applied in such a way that the steel frame is effectively protected from access of moisture. The structure as to its frame and walls can also be very quickly and economically erected; for example, the frame of a residence of average size may be erected with a small force of workmen in one week, and the walls and roof coverings applied in one week.

The characteristics and advantages of the invention are further sufficiently explained in connection with the following detail description of the accompanying drawings, which show certain respective embodiments of the invention. After considering these examples, skilled persons will understand that many variations may be made within the principles of the invention, and I contemplate the employment of any structure that is properly within the scope of the appended claims.

Fig. 1 is a perspective view of a part of a typical upper frame and roof structure embodying the invention in one form.

Fig. 2 is a fragmentary perspective of a lower frame structure.

Fig. 3 is a transverse section of a roof structure.

Fig. 4 is a horizontal section of corner frame and wall structure.

Fig. 5 shows a modified roof structure.

Fig. 6 shows another modified roof structure.

Fig. 7 shows a modified wall and corner structure.

Figs. 1 and 2 taken together sufficiently explain a typical frame and sheathing, or wall and roof construction. Steel columns 1, usually of I section, have their bases secured in any approved way in a concrete foundation 2. Floor and roof beams, sufficiently represented by the upper beam 3 of Fig. 1, are secured to the columns by plates 4 and rivets, as usual in steel frame structures.

The wall proper consists of slabs or blocks 6 of material known as corkboard, of substantial thickness suitable to the class of structure, and having their lengths and vertical dimensions suited for the class or dimensions of the structure, so as to avoid unnecessary cutting of the blocks; although they may be easily cut whenever necessary to fit available spaces.

The outer wall may consist as shown in Figs. 2 and 4 of a single course of blocks with their ends overlapped at the wall corners, the corner blocks desirably being secured together by staples 7 or other suitable devices. The adjacent edges and surfaces of the blocks are desirably connected by a suitable cement, such as asphalt, as at 8.

Both inner and outer surface finishes are desirably provided, and while these may vary largely, in preferred cases the surface finish consists substantially of stucco or plaster. Particularly, as shown in Figs. 2 and 4, the outer surface desirably consists of a layer of stucco 9 which may be applied directly to the outer surfaces of the corkboard walls but desirably is secured or bonded as by expanded metal lathing 10, secured to the blocks by staples or in any other convenient way before the stucco is applied, whereupon the stucco penetrates the interstices of the lathing and is firmly secured in position and the lathing moreover forms a strong bond or retaining medium for the wall blocks.

Similarly the inner wall surfaces may be covered with metal lathing 11 upon and through which is applied a layer of plaster 12. Any other final or outer surface finish may be applied to either face of the wall. For example, the stucco layer 9 (Fig. 4) is overlaid by an outer coating 13 of suitably tinted stucco, or pebble-dash mixture and evidently almost any exterior finish or appearance may be provided in accord-

ance with known methods. An inner or finishing layer 14 of plaster may be applied over the plaster base layer 11 and any other desired variations may be made to provide a satisfactory inside finish. The lathing and plaster coatings may be carried around the columns such as 1 as sufficiently explained in Fig. 4 and also around the beams to completely enclose, protect and conceal them.

The roof structure may vary as necessary in accordance with known methods of roof construction or design. The single example given as illustrative of roof-construction principles is a peaked roof, the frame-work of which comprises single or composite roof beams 20, Figs. 1 and 3, which are desirably of inverted T section. The upper ends of the beams, at the peak, are connected to a ridge beam 21. The roofing blocks 22 of composition similar to the wall blocks, are laterally dimensioned to fit between the vertical webs of the roof beams and to rest upon the horizontal webs or flanges thereof. Desirably the roof blocks are substantially thicker than the vertical dimension of the vertical webs of the beams, and the space thus provided between upper adjacent margins of the blocks are filled with any suitable composition such as cement, or asphalt, 23.

Any suitable surface covering or finish may be provided but desirably this is of a fireproof character such as any suitable slates or tiles, the example given consisting of strip shingles 24 of fibrous material coated with slag, gravel or the like, which are overlapped in the usual way, and are practically fireproof.

Either the side wall or roof construction may be in the form of double layers or courses, instead of single layers or courses. Thus in Fig. 7 a double-course wall construction is shown, comprising the outer course consisting of the blocks 6 as previously described, and also an inner course composed of blocks 30. When such an inner wall course is used it provides for concealing the columns and beams in the manner sufficiently explained in Fig. 4 with relation to a corner column 1. Thus the end faces of the blocks 30 next to the column overlap its entire surface, and the columns and beams are thus entirely enclosed and concealed without producing any projections or irregularities in the wall surfaces.

Fig. 6 shows a roof structure which is similar to that of Fig. 3 with the addition of an inner layer of sheathing consisting of inner blocks 40 which usually may be thinner than the outer blocks 22, these inner blocks being applied below the outer blocks and below the horizontal or inner flanges of beams 20 to protect the latter from flame in case of an interior fire. The joints 41 between the inner blocks 40 are located between the beams and these joints may be filled with a suitable cement such as asphalt 41, and asphalt may also be placed between the inner and outer blocks as at 42 to fill the spaces and aid in securing the inner blocks in position. Desirably additional means are provided for securing the inner blocks, and preferred means for this purpose consist of spikes 43 driven diagonally through the inner blocks and into the outer blocks. Preferably these spikes are made of non-heat-conducting material, such as a suitable wood, and specifically the spikes may be hickory skewers.

Otherwise, a single-layer roof may be constructed or arranged as shown in Fig. 5 to protect the inner faces of the beams. In this case the blocks 45 may be substantially thicker than in the structure of Fig. 3, and they are provided in opposite faces with rabbets or channels 46, located substantially above the inner faces of the blocks, to approximately fit and fully enclose the horizontal beam flanges.

Interior walls or partitions may also when desired be of corkboard construction, in accordance with the general principles above explained.

In a steel-frame structure such as shown, the weight of the floors above the ground floor may when desired be conveniently supported from the roof structure, and in such cases the lower-story partitions are not required to carry any of the upper-floor weight, and partitions may therefore be arranged at will, without regard to weight-supporting characteristics.

The described structures are practically fireproof, or very highly fire-resistant. The corkboards employed consist of granulated cork pressed and heated in proper form and thus selfbound by the exuded gum of the material. Even if subjected to direct flame, corkboard composed as described will not burn but merely slowly chars or carbonizes even under the condition of direct application of an intense flame, so that the walls proper are inherently noncombustible or slow burning, and will not support combustion in absence of applied flame. When overlaid with suitable stucco or plaster in the manner above described this naturally resistant material is effectively protected from direct application of flame either from the outside or the inside of the wall structure, and therefore the corkboards will remain intact without combustion even in the presence of a high degree of heat applied to the plaster or stucco surfaces. The roof structure, composed of similar corkboard with an additional outer covering of fireproof material such as tiling of the character above mentioned, is also practically fireproof. The employment of an inner roof layer as in Fig. 5 additionally protects the roof structure from fire propagation from the interior of the building.

In addition to the fire-resisting characteristics, the building of which all exterior walls and roof surfaces consist primarily of corkboard constitutes a very effective heat insulator, so that the building may be effectively heated in winter at low cost, since internal heat is radiated very slowly through the cork structures; while in summer the building is correspondingly cool since external heat is largely excluded by the insulating character of the wall and roof structure.

The wall and roof structures furthermore provide no spaces or means of sustenance for vermin, and the entire structure is practically vermin-proof. The wall and roof blocks together with the bonding devices and cement such as asphalt, also effectively enclose and protect all the steel frame members from access of moisture and rusting.

The fact is especially emphasized that, while a metal frame is employed, which is in itself a good heat-conductor, the entire outer sheathing of the building, including the walls and roof, consists of a very efficient heat-insulator and no parts of the metal structure extend through this sheathing so that heat-transfer between the inside and outside of the building is almost entirely prevented.

I claim.

1. A building structure comprising a steel frame and walls substantially enclosing the frame and consisting of blocks of corkboard, asphalt sealing cement interposed between and interconnecting abutting faces of adjacent blocks of corkboard, mechanical means penetrating partially adjacent blocks of corkboard disposed on adjacent sides of parts of the steel frame for interconnecting the blocks to one another, and an internal finishing layer of plaster.

2. A building structure comprising metal wall columns having flanges, an outer sheathing composed of blocks of corkboard, an inner sheathing composed of blocks of corkboard, certain of said blocks of said outer and inner sheathing being disposed on opposite sides of said flanges, asphalt cement applied to faces of said certain blocks and to adjacent portions of said flanges for sealing the intervening spaces and for securing the blocks to said wall columns, and mechanical means penetrating said certain blocks for securing said blocks to one another and to said wall columns.

3. A building structure comprising a steel frame, and walls substantially enclosing the frame, said walls consisting of blocks of corkboard disposed in vertical and horizontal adjacency to one another completely enclosing the frame, mechanical means penetrating partially adjacent blocks of corkboard disposed on adjacent sides of parts of the steel frame for securing the blocks to one another and a cement applied to faces of certain blocks and adjacent portions of said frame for securing said faces to one another and to said frame.

4. A building structure comprising a steel frame, and walls substantially enclosing the frame, said walls consisting of blocks of corkboard disposed in vertical and horizontal adjacency to one another completely enclosing the frame, mechanical means penetrating partially adjacent blocks of corkboard disposed on adjacent sides of parts of the steel frame for securing the blocks to one another, a cement applied to faces of certain blocks and adjacent portions of said frame for securing said faces to one another and to said frame, and an external finishing layer of plastic material secured to and extending over the outer faces of the corkboard blocks.

5. A building structure comprising a steel frame, and walls substantially enclosing the frame, said walls consisting of blocks of corkboard disposed in vertical and horizontal adjacency to one another completely enclosing the frame, mechanical means penetrating partially adjacent blocks of corkboard disposed on adjacent sides of parts of the steel frame for securing the blocks to one another, a cement applied to faces of certain blocks and adjacent portions of said frame for securing said faces to one another and to said frame, and an external finish comprising expanded metal lathing secured to and interconnecting the corkboard blocks at their outer faces.

JUNIUS H. STONE.